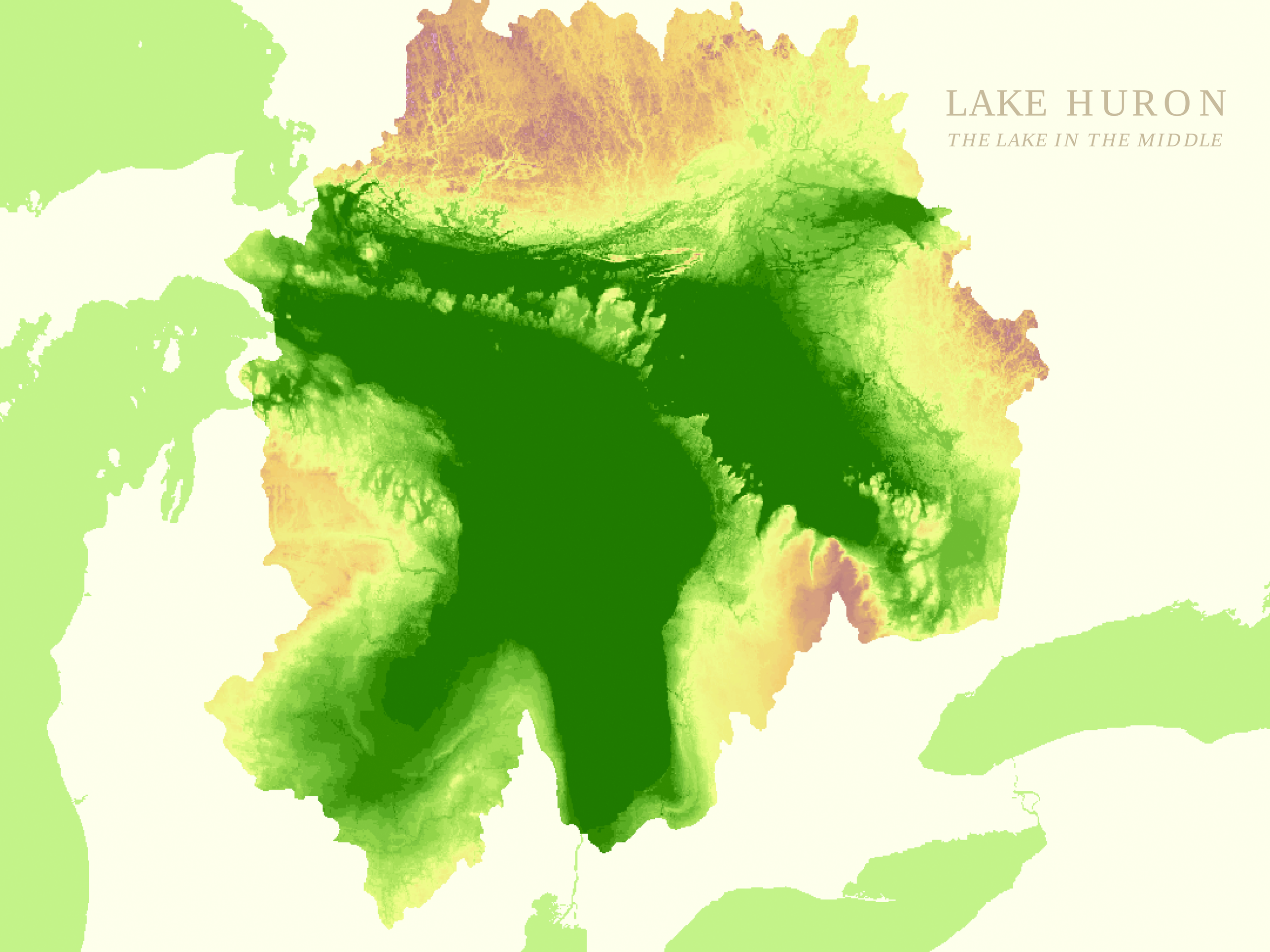
LAKE HURON

THE LAKE IN THE MIDDLE



LAKE HURON

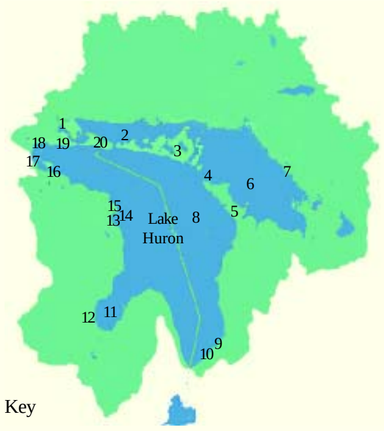
the lake in the middle


Kathy Sutton

A LAKE OF MANY ISLANDS

Lake Huron is a unique system within the Great Lakes basin. It is made up of four bodies of water: the North Channel, Georgian Bay, Saginaw Bay and Lake Huron proper. This Great Lake is considered the "lake in the middle" because it receives water from two of the Great Lakes, Lakes Superior and Michigan, and it sends its water to Lakes Erie and Ontario. Lake Huron has the longest shoreline of all of the Great Lakes and has more islands than any other lake in the world. It has over 30,000 islands, including Manitoulin Island, the largest island in any freshwater lake. The large number of islands, along with the low level of human impact on both sides of Lake Huron, create ideal habitat for many unique plants and animals, some even globally rare. All of these qualities contribute to the significance and importance of Lake Huron and its watershed.

During the State of the Lakes Ecosystem Conference '96 (SOLEC '96), a biennial conference sponsored by the United States Environmental Protection Agency and Environment Canada and directed toward Great Lakes activities, participants recommended an assessment of the Lake Huron Ecosystem. In response to the need for a lakewide effort to protect and restore Lake Huron, the *Lake Huron Initiative* was established by representatives from the Michigan Office of the Great Lakes, state, provincial, federal and local agencies and interest groups with a goal "to restore and maintain the chemical, physical, and biological integrity of the waters, tributaries, and nearshore terrestrial and aquatic ecosystems of Lake Huron." As part of the *Lake Huron Initiative* effort, this poster has been designed to portray the importance of restoring and protecting ecological areas within the Lake Huron basin. It includes descriptions of important ecological and key geographical areas and where they are located in the watershed.



Key

1 - St. Marys River
2 - North Channel
3 - Manitoulin Island
4 - Fathom Five National Marine Park
5 - Bruce Peninsula
6 - Georgian Bay
7 - Parry Sound
8 - Six Fathom Bank
9 - Sauble Beach
10 - The Pinery Provincial Park
11 - Saginaw Bay
12 - Tobico Marsh
13 - Thunder Bay Marine Sanctuary
14 - Misery Bay
15 - El Cajon Bay
16 - Grass Bay
17 - Straits of Mackinac
18 - Horseshoe Bay Wilderness Area
19 - Les Cheneaux Islands
20 - Drummond Island

COASTAL WETLAND ECOSYSTEMS

Coastal wetlands are an important part of the biodiversity of shoreline areas. Over one-third of globally significant biodiversity features within the Great Lakes are strongly associated with wetlands and shoreline features. Eighty percent of the Great Lakes fish species are found in nearshore areas for some part of the year and depend directly on the coastal wetlands for some part of their life cycle. Lake Huron coastal marshes provide nesting and staging areas for hundreds of thousands of migratory and nesting birdlife, including at least 30 species of wading and shore-birds, 27 species of ducks, geese and swans, and several species of terns and gulls. These areas also provide important hunting areas for the many pairs of bald eagles that nest near the shoreline. In addition, Lake Huron wetlands provide important habitat for various amphibians and reptiles.


David Kenyon

American bittern *(Botaurus lentiginosus)*

Saginaw Bay is another rich, biological resource and the largest freshwater coastal wetland in the United States (1,143 square miles, 2,961 square kilometers). This area has many sub-bays, which are believed to be primary nursery grounds for many freshwater fish species and various animals. Tobico Marsh, within Saginaw Bay, is one of the best quality, fresh-water marshes in the north central United States because of its large size, relatively undisturbed condition, and the variety of aquatic plant communities.

Many coastal wetlands can also be found in areas along the St. Marys River, the North Channel, Les Cheneaux Islands, Saginaw Bay, the eastern shore of Georgian Bay, Northern Michigan, and Northern Ontario. They are threatened by land development, dredging projects and drainage to create intensive recreation areas, marinas, and lake homes. Coastal wetlands, along with the many open and protected embayments, contribute to the complexity of the shoreline throughout Lake Huron.


Pinery Provincial Park

The Pinery

The Pinery Provincial Park, located on the southern Ontario shores of Lake Huron, contains one of the largest black oak savannas, a habitat composed of oaks and meadows. Over 99.97 percent of the oak savanna in the world has been eliminated or altered, but through proper management techniques, the Pinery has restored and protected its oak savanna ecosystem. The landscape of the Pinery is dominated by dunes and interspersed meadows. Over 700 plants and 300 bird species have been recorded in this park, including the Bluehearts flower found in the park's wet meadows. This rare flower is extirpated in Michigan and grows nowhere else in Canada. Ontario's only lizard, the five-lined skink, can also be found in this park along with the Eastern Hognose snake, both rare species.


Patrick J. Comer

SWALES

Swales are shoreline areas located between the foredune and the backdune where small ponds are created due to the fluctuation of Great Lakes water levels. Low lake levels can often leave the ponds completely dry; however, this fluctuation in the water level creates a diversified plant and animal community. Swales are home to many globally rare plant species such as Houghton's goldenrod, which can be found throughout the swales of Grass Bay on the northeastern tip of Michigan's Lower Peninsula. Populations of Hine's emerald dragonflies, a federally endangered species, have been discovered within the swales near St. Ignace and also in the Alpena area.


Harold Malde

Butterwort *(Ringuicula vulgaris)*

Swale complexes are common to other areas throughout the Straits of Mackinac and Saginaw Bay; however, they are being threatened by residential and industrial development, off-road vehicles, sand dune mining, and intensive recreational use.


D.A. Albert

FENS

Fens are peat-forming wetlands that receive water from precipitation, runoff, and groundwater movement. They are recharged by groundwater and runoff from surrounding mineral soils and typically form a narrow wetland in protected embayments in coastal areas. Rich fens can be found in Horseshoe Bay Wilderness Area, El Cajon Bay, and along the shorelines of Misery Bay, Manitoulin Island and the Straits of Mackinac.

Fens provide important benefits to the Lake Huron watershed, including preventing or reducing the risk of floods, improving water quality, and providing habitat for unique plant and animal communities. Great Lakes coastal fens, also known as shoreline meadow marshes, have been identified by The Nature Conservancy as globally imperiled communities. These beneficial areas are being threatened by common human impacts such as filling, dredging, and pollution from residential and industrial developments.

TRIBUTARIES


David Kenyon

The ecological well-being of Lake Huron and its watershed is determined to a great extent by the condition of its tributaries. Moderate flow of sediment, nutrients, energy, and biota is very important to a stream's physical and biological processes. Tributaries are critical for the reproduction of native fish such as lake sturgeon, walleye, longnose suckers, and white suckers and for introduced salmon and steelhead (rainbow) trout. Historically, they were also used by whitefish and lake trout for spawning. The tributaries of the Saginaw River have been important spawning grounds for walleye and various other fish. These tributary streams are of great value because they provide critical habitat for spawning and young fish.

Tributaries have been degraded by runoff from residential, agricultural, industrial and commercial land use. High levels of nutrients from fertilizers and other chemicals, along with excessive sediment from soil erosion, threaten the water quality and thus impact this prime habitat for wildlife. Today, most of Lake Huron's tributaries are blocked by dams. For example, on the Michigan side of Lake Huron, most tributaries were once available to Lake Huron fish for spawning; now many have been blocked by dams and barriers, leaving only a small percentage of Lake Huron's historically available tributaries accessible for spawning. Largely for this reason, Lake Huron's trout, salmon, and walleye fisheries are not self-sustaining and remain dependent upon stocking. Lake sturgeon are classified in Michigan as "threatened" largely due to the loss of tributary spawning habitat.

SAND DUNE ECOSYSTEMS

The eastern shores of Lake Huron and Georgian Bay along with the western shores of the Bruce Peninsula, are lined with white sandy beaches, sand dunes, and clear waters, which attract wildlife and visitors. These dune areas are home to many rare plants and animals such as the lakeside daisy and the piping plover. The remarkable ecology of dunes, and their importance as habitat and as shore protection features, has not been well understood by the public. Dunes have not only become threatened by development pressures along the lakeshore, but by excessive recreational uses.


Pinery Provincial Park

ALVAR ECOSYSTEMS

Alvars are a rare habitat type characterized by areas of relatively flat terrain composed of limestone bedrock where the soils were scraped away long ago by the retreating glaciers. They extend through Drummond Island, Manitoulin Island, and down through the Bruce Peninsula in Ontario, with a few sites scattered in Michigan's Lower Peninsula.

Alvars are very harsh environments. These specialized habitats have very poor drainage, which contributes to flooding in the spring. The limestone substrate creates a very hot and dry environment in the summer. Due to the extreme fluctuation from wet to dry and shallow soils, mosses, lichens, and various rare plants tend to dominate the landscape. The few conifer trees that do manage to grow are among the oldest in the Great Lakes basin.


Scott White

Alvars are especially vulnerable to human threats. Low density rural developments, such as cottages and second homes, pose a serious threat to this fragile system. Recreational uses also threaten alvars. Gardeners, bicyclists, and off-road vehicle enthusiasts disrupt the natural water flow patterns and create ideal conditions for invasions by exotic species. Logging and other forestry practices cause substantial alterations to the landscape. Many alvars are in parks and preserves; however, the majority remain unprotected. The International Alvar Conservation Initiative, a Canadian and United States collaborative study, identified priority sites that are in need of protection. Almost one-third of the highest priority sites occur on Manitoulin Island. Even many protected alvars require on-going management to preserve them.


Patrick J. Comer

OPEN WATER ECOSYSTEMS

When lake trout were extirpated from most of the Great Lakes, native populations only survived in Lake Superior and two small areas of Lake Huron. With the exception of Lake Superior, success at rehabilitating lake trout in other areas of the Great Lakes has been very limited. Lake Huron currently has six sites where natural reproduction has been documented including Parry Sound, in eastern Georgian Bay. These fish have survived due to their relative isolation that limited the detrimental impacts of both sea lamprey and commercial harvest. Other important aquatic habitat areas within the Lake Huron basin include Fathom Five National Marine Park and Fish Islands, Six Fathom Bank, Bruce Peninsula, Saginaw Bay, Sauble Beach, Thunder Bay, Drummond Island and the northern shores of Lake Huron. Fathom Five National Marine Park and Bruce Peninsula National Park make up the Fathom Five, which is composed of green islands, lake bottoms and water. Unique to Lake Huron is the first freshwater sanctuary; Thunder Bay National Marine Sanctuary near Alpena, Michigan.

Through the 1980s and 1990s, a progression of increasingly restrictive angling regulations, including creating a refuge area, were implemented to limit the harvest of wild and stocked fish. Now, the spawning population is estimated at over 29,000. The Parry Sound lake trout population has demonstrated that rehabilitation is possible if sea lamprey are controlled, the appropriate lake trout strain is stocked and exploitation is restricted. The successful reproduction of lake trout in other areas of Lake Huron suggests that similar successes are possible.

Bedrock Shores and Reefs

The north shores of Lake Huron and the eastern shores of Georgian Bay are scattered with an extensive archipelago of bedrock islands and many sheltered bays and fjords. Areas along the southern shores of Manitoulin Island also share exposed slopes of limestone bedrock and cobble shorelines. Limestone, hardened by magnesium over hundreds of millions of years, created hard dolomite rock that today characterizes the steep cliffs and bolder shorelines of what was once a tropical saltwater sea. Softer limestone has been eroded away by wave action, leaving magnificent overhanging cliffs at various points along the shore. In some areas extensive erosion has even created caves. This section of the Great Lakes shoreline supports significant plant and animal life due to its diverse habitats.

Reefs like 6-Fathom Bank and Drummond Island Reef were the important mainstays of Lake Huron's lake trout reproduction and still are the source of lake whitefish reproduction. Reefs suitable for lake trout reproduction are bedrock or glacial formations of clean stone and bedrock that offer aerated crevices and pockets for eggs to incubate. These spaces also offer shelter from weather and egg predators. They are critical habitats for lake trout, which were historically the keystone predator of Lake Huron.

The poster was produced by Emily Finnell, Office of the Great Lakes, Michigan Department of Environmental Quality.

The map on the opposite side of the poster reflects surface elevation in the Lake Huron watershed, with the highest elevations being dark red. The map was produced by John S. Clark, Land and Water Management Division, Michigan Department of Environmental Quality, using "Digital Terrain Elevation Data Level 0" from the National Imagery and Mapping Agency. This poster is funded, in part, by the U.S. Environmental Protection Agency, Great Lakes National Program Office.

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